

A Multi-User Interactive Optimization Tool (WRESTORE)

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This is NSF funded joint project between Earth Science and Computer Science. It's one of the objective is to provide best farming practices to the people of Eagle Creek, Indiana, so as to minimize the soil erosion, fertilizer loss and maintain water quality of the region while maximizing profit of farmers. The most important benefit to general public will be increase in quality of drinking water and decrease in flooding of the region.

The tool we have built is a distributed system which uses high performance computing techniques to run model simulations in an efficient manner. The tool has various components which run on multiple computers. The user login via a web based interface, the design parameters are specified which are being used to generate different possible designs. The design evaluations are done using powerful cluster of computers (having 768 or 224 CPUs), which uses concept of virtual agents in doing the design evaluation. The user provides their feedback to different designs which are again considered to generate another set of better designs. Various optimization and machine learning techniques are used to model the user's preferences and provide best possible designs based on given scenario. It is like human computer collaborative search, where human and computer both work together to achieve the goal in a better way.

The project is still ongoing, till now we have run simulated user model only, but sooner we will be running the tests for the real human users. This will help the farmers, govt. agencies like USDA and environmentalists in doing environmental planning in an efficient manner. Our collaborators are Empower Results, Eagle Creek Watershed Alliance, Indiana NRCS, Center for Earth and Environmental Sciences, Upper White River Watershed Alliance.

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